Clinical Laboratory Science (BS)

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Co-Chair: Elizabeth Hogan, PhD (hogane@canisius.edu)

Introduction
Medical Laboratory Scientists perform tests to help diagnose and treat disease and maintain wellness. Medical laboratory data is the basis of up to 80 percent of all medical diagnoses. Advances in technology and prescription medical treatment, the mapping of the human genome, and the aging of America's population all contribute to the growing national demand for clinical lab professionals. Our program prepares graduates to analyze human blood, tissues and body fluids which aid in the diagnosis, treatment, and prevention of diseases. Medical Laboratory Scientists conduct such tests as typing and cross matching of blood and blood components, drug monitoring (for therapeutic and illegal drugs), identifying infectious microorganisms and their susceptibility to specific treatments, determining a patient's genetic predisposition to a variety of inherited diseases, and identifying anemias, leukemia and other blood disorders. For a more detailed description of the program, faculty, facilities, academic and co-curricular opportunities please go to the Medical Laboratory Science website (https://www.canisius.edu/academics/programs/medical-laboratory-science).

The interdisciplinary curriculum of the Medical Laboratory Science major is concentrated in the natural sciences with special emphasis on biology and chemistry. Students take classes on campus for the first three years of the program and spend their senior year in either an 11-month or a 51-week hospital based clinical internship. During the clinical internship, students study the full range of clinical laboratory fields including hematology, clinical chemistry, immunology, microbiology, histology and immunohematology.

At Canisius, this learning experience is one of quality and value enhanced by small class sizes. The full-time professors you will encounter are trained professionals who hold doctoral degrees in their areas of expertise. During the clinical internship, the faculty will consist of PhDs, pathologists, clinical laboratory scientists, and others recognized for their experience in the various sub-specialties of laboratory medicine.

To be successful in the profession, you must be licensed by the New York State Office of the Professionals. To learn more information about the licensure program please go to the NYSED website (http://www.op.nysed.gov).

Qualifications
The program is a rigorous one, with very modest flexibility. The course offerings reflect the solid background in the sciences required for the internship experience. During the student's junior year, application is made to accredited hospitals and schools of medical technology. The burden of acceptance into a hospital program rests with the students. Canisius currently affiliates with the Rochester General Hospital School of Medical Technology (Rochester, NY) and UPMC Chautauqua WCA Hospital School of Medical Technology (Jamestown, NY). Students are enrolled as Canisius students while completing the hospital program. Because this program requires a competitive application into the hospital based clinical year, we recommend a minimum GPA of at least 3.00 with a strong performance in the upper level sciences.

Advisement
All students should have an advisor in the major and should contact the department directly to have an advisor assigned if they do not already have one. Meetings with academic advisors are required prior to students receiving their PIN for course registration each semester. All majors should work closely with their advisor in discussing career expectations, choosing their major electives, developing their entire academic program and planning their co-curricular or supplemental academic experiences.

Curriculum
An Ignatian Foundation
All undergraduate students must complete either the Canisius Core Curriculum (http://catalog.canisius.edu/archive/2018-2019/undergraduate/academics/curricular-information/core-curriculum) or the All-College Honors Curriculum (http://catalog.canisius.edu/archive/2018-2019/undergraduate/academics/curricular-information/all-college-honors-program). Many schools refer to their college-wide undergraduate requirements as “general education” requirements. We believe that the core curriculum and the honors curriculum are more than a series of required classes; they provide the basis for a Jesuit education both with content and with required knowledge and skills attributes that are central to our mission.

Free Electives
Students may graduate with more but not less than 120 credit hours. Free electives are courses in addition to the Canisius Core Curriculum or All-College Honors Curriculum and major requirements sufficient to reach the minimum of 120 credit hours required for graduation.

Major Requirements
(20 courses)

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>BIO 114 &amp; 114L</td>
<td>Human Biology: Introduction to Human Anatomy and Physiology</td>
<td>4</td>
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<tr>
<td>&amp; BIO 111 &amp; 111L</td>
<td>Introductory Biology I and Introductory Biology Laboratory I</td>
<td>4</td>
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<tr>
<td>&amp; BIO 112 &amp; 112L</td>
<td>Introductory Biology II and Introductory Biology Laboratory II</td>
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</tr>
<tr>
<td>&amp; BIO 211 &amp; 211L</td>
<td>Biochemistry and Cell Biology I and Biochemistry and Cell Biology Lab I</td>
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</tr>
<tr>
<td>&amp; BIO 212 &amp; 212L</td>
<td>Biochemistry and Cell Biology II and Biochemistry and Cell Biology Lab II</td>
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</tr>
<tr>
<td>&amp; BIO 307 &amp; 307L</td>
<td>Microbiology and Microbiology Laboratory</td>
<td>4</td>
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<tr>
<td>&amp; BIO 426 &amp; 426L</td>
<td>Immunology and Immunology Laboratory</td>
<td>4</td>
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<tr>
<td>&amp; CHM 111 &amp; 111L</td>
<td>General Chemistry I and General Chemistry I Laboratory</td>
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<tr>
<td>&amp; CHM 112 &amp; 112L</td>
<td>General Chemistry II and General Chemistry II Laboratory</td>
<td>4</td>
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<tr>
<td>&amp; CHM 227 &amp; 227L</td>
<td>Organic Chemistry I and Organic Chemistry I Laboratory</td>
<td>4</td>
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<tr>
<td>&amp; CHM 228 &amp; 228L</td>
<td>Organic Chemistry II and Organic Chemistry II Laboratory</td>
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<tr>
<td>MAT 141</td>
<td>Inferential Statistics and Computers for Science</td>
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Science Elective: Two upper level science courses approved by Director
MDT 280 Seminar: Sophomore Level I  2 Credits
& MDT 281 Seminar: Sophomore Level II
MDT 380 Seminar: Junior Level I  2 Credits
& MDT 381 Seminar: Junior Level II
MDT 400 Hospital Rotation: Med Tech I  30 Credits
& MDT 401 Hospital Rotation: Med Tech II

Total Credits: 88-90

Learning Goals & Objectives

Student Learning Goal 1
Medical Laboratory Science majors will possess the scientific knowledge and laboratory skills to be competent and contributing members of the health-care delivery system. (Science)

Students will:
- **Objective A**: Demonstrate foundational knowledge in inorganic chemistry, organic chemistry, biochemistry, anatomy and physiology, microbiology, immunology, and statistics
- **Objective B**: Understand the components of the diagnostic process and the role of the clinical laboratory; and
- **Objective C**: Perform and interpret results of clinical laboratory tests including: blood bank, urinalysis and other body fluids, chemistry, hematology, immunology, and microbiology.

Student Learning Goal 2
Medical Laboratory Science majors will effectively communicate audience specific medical and scientific information. (Communication)

Students will:
- **Objective A**: Accurately record laboratory results;
- **Objective B**: Effectively communicate laboratory results to others; and
- **Objective C**: Use appropriate information to explain laboratory tests and results.

Student Learning Goal 3
Medical laboratory Science majors will demonstrate professional and ethical behavior. (Professionalism)

Students will:
- **Objective A**: exhibit appropriate patient interaction and confidentiality;
- **Objective B**: Objective B: adhere to safety guidelines and regulations; and
- **Objective C**: demonstrate positive and constructive interactions with peers, medical team, and patients.

Courses

MDT 280 Seminar: Sophomore Level I  1 Credit
Introduction to the Clinical Science Laboratory profession from variety of perspectives: history, present state of health-care delivery, job opportunities, organization of hospital laboratory. Tour of hospital laboratory.
**Prerequisite**: permission of program director.

MDT 281 Seminar: Sophomore Level II  1 Credit
Continuation of MDT 280.
**Prerequisite**: permission of program director.

MDT 380 Seminar: Junior Level I  1 Credit
Advanced discussions of Clinical Science Laboratory theory and practice designed as preparation for senior-year hospital rotation. Tour of hospital laboratory.
**Prerequisite**: permission of program director.

MDT 381 Seminar: Junior Level II  1 Credit
Continuation of MDT 380.
**Prerequisite**: MDT 380 and permission of program director.

MDT 400 Hospital Rotation: Med Tech I  15 Credits
A year-long, hospital based program. Students learn to perform, develop, evaluate, correlate and assure accuracy and validity of laboratory information in areas such as Clinical Chemistry, Hematology/Hemostasis, Immunology, Immunohematology/Transfusion Medicine, Microbiology, Urine and Body Fluid Analysis; direct and supervise clinical laboratory resources and operations; and collaborate in the diagnosis and treatment of patients.
**Prerequisite**: acceptance into a hospital-based clinical program.

MDT 401 Hospital Rotation: Med Tech II  15 Credits
A year-long, hospital based program. Students learn to perform, develop, evaluate, correlate and assure accuracy and validity of laboratory information in areas such as Clinical Chemistry, Hematology/Hemostasis, Immunology, Immunohematology/Transfusion Medicine, Microbiology, Urine and Body Fluid Analysis; direct and supervise clinical laboratory resources and operations; and collaborate in the diagnosis and treatment of patients.
**Prerequisite**: MDT 400.